

Distance Learning in Russian Schools during the COVID-19 Pandemic: Predicting Student Outcomes

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Abstract The outburst of COVID had a major impact on the lives of people all over the world. While educational systems were developing plans, preparing teachers and schools for transition to distance learning, students were left in the situation which required them to organize their studies by themselves. This paper attempts to identify predictors of student learning outcomes, namely, students’ self-rated achievements, learning effort, and emotions, during the lockdown based on the data derived via the School Barometer survey in Russia. A total of 22080 students from 85 Russian regions participated in the survey. Relative weight analysis found statistically significant predictors for students’ learning outcomes: *‘learning effort’ and ‘negative emotions’*. The paper addresses such issues as student autonomy, teaching practices, and access to education.

Keywords student learning, COVID-19, school lockdown, school barometer, learning effort, students’ achievements

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The COVID-19 pandemic became a big challenge for educational systems all over the world. In the situation of prevailing uncertainty, schools were caught off guard and had to adapt their educational programs to the new reality by switching to distance learning. The quarantine required prompt decisions from educational authorities in most countries. While skepticism over distance learning and confidence about the short-term nature of the pandemic were growing among teachers, parents, and other stakeholders, teams of scholars were carrying out extensive research to collect relevant data, which could help school principals and government authorities to plan their next steps and make fast data-informed decisions.

Both during the outburst of the pandemic and after it, the scope of research widened to include teacher practices, the effects and consequences of distance learning, inequality, and many other topics [Corbi, Burgos, 2021; Datzberger et al., 2022; Tlili et al., 2022].

Most studies of this kind carried out in Russia during COVID-19 were concerned with preparedness of schools for distance learning and difficulties they faced as a consequence. The large-scale survey of teachers conducted by the Higher School of Economics Laboratory of Media Communications in Education was one of the very first studies in Russia. The research intended to bring to light challenges teachers faced during the early days of pandemic and self-isolation. A total of 22,600 teachers from 73 Russian regions took part in the survey. Among other things, the study identified the issues the teachers experienced when launching distance learning: difficulties trying to reach all the students via video conference (for example, problems with students' registrations) (41%), video platform outages due to the overload (40%), and low Internet speed (33%) [Saprykina, Volokhovich, 2020].

The research carried out by the analytical center of NAFI (in total about 800 school teachers were interviewed) revealed similar results. The survey data show that teachers often complain about both technical facilities of their own educational organizations (61% rated the equipment as unsatisfactory) and students' skills in using digital tools (29%). Among the difficulties researchers also mention is an increase in the workload of teachers (74%)¹. What is more, 68% of the school teachers interviewed believe that "the school education system is not ready for the transition to distance learning."

At the same time, ONF (All-Russian People's Front), together with the MAXIMUM² educational center, interviewed 29,000 teachers. The survey revealed that 80% of respondents faced problems in the new challenging situations of distance learning. The most common difficulties the teachers experienced were a shortage of

¹ <https://nafi.ru/analytics/sistema-obrazovaniya-okazalas-ne-gotova-k-perekhodu-na-distantsionnoe-obuchenie-v-usloviyakh-pandemi/>

² https://maximumeducation.com/news/survey_teachers%20

computers and mobile devices for students, technical problems in schools, and a lack of experience in using the Internet³.

Among other research, Dobryakova and Novikova [2020] conducted an online survey of 7,272 parents and children. The authors argue that families failed to adapt to the new educational format. In fact, families with limited resources and those whose children have minimal online learning experience faced problems [Dobryakova, Novikova, 2020]. According to another study by the same team, it is not only the socio-economic status of the family that affected the educational trajectories of students and the subjective self-perception of families during distance learning. Students from families where the professional activity of parents assumed non-routine actions and greater autonomy in the workplace proved good at organizing their own work: they could set learning goals and objectives; prioritize; manage their own time; motivate and control themselves [Dobryakova et al., 2021].

All research carried out in Russia addressed the opinions of different respondent groups and different aspects of the educational process; however, none was aimed at identifying predictors of student's learning outcomes during the pandemic. In this way, being a part of the School Barometer project initiated by the World Education Leadership Symposium (WSLS)⁴, our research team carried out studies in Russia. The project allowed us to identify what different stakeholders, such as principals, teachers, students, parents, and educational authorities, were experiencing during the pandemic and distance learning [Isaeva et al., 2020]. In this paper, we focus on the students' data and intend to answer the following research question: "What are the most important predictors central to student learning outcomes during the COVID-19 school lockdown in Russia?"

The COVID pandemic and lockdown regime in Russia

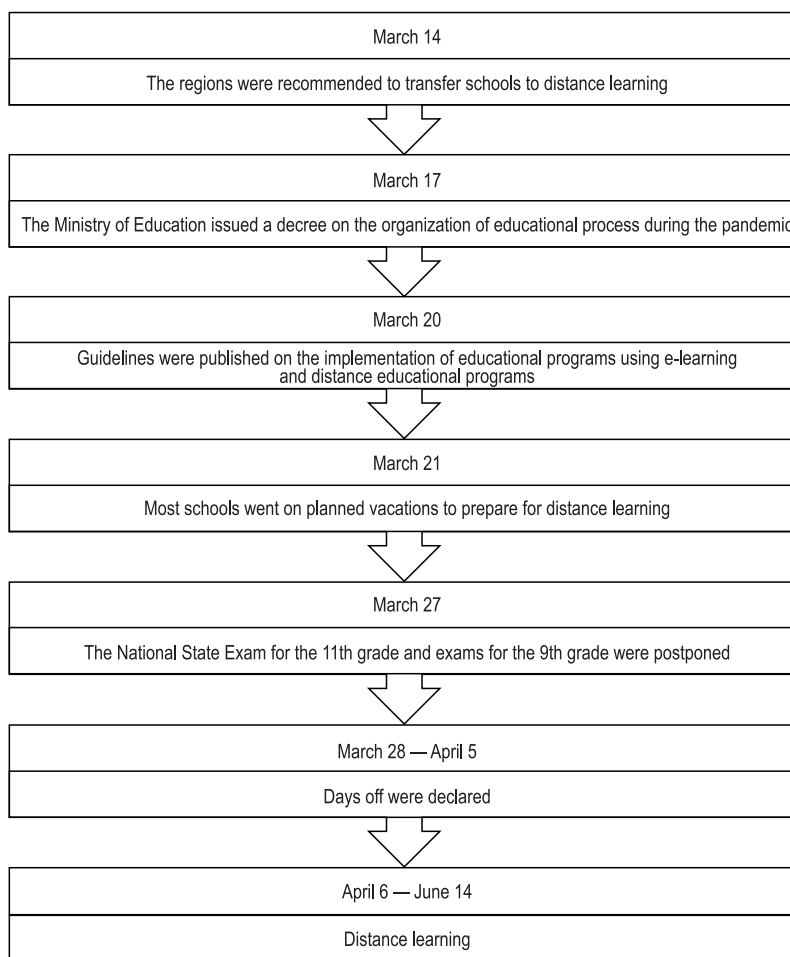
The lockdown regime and measures taken by governments differed from country to country. It was not only the lockdown timelines that varied, but also the measures taken by educational authorities to support schools, teachers, and families. This is true for Russian regions as well. In this regard, even within one country we could see a variety of approaches. Thus, although regions were recommended to transfer schools to distance learning in the mid of March, not all of them were ready for such a transition; therefore, a number of regions postponed it. For instance, in Ulianovsk oblast distance learning began on April 8. Altai Krai launched remote learning on April 13; before that, school principals and educational authorities ensured proper conditions for online classes. Thus, distance learning was introduced across Russia on April 6 and lasted till June 14 (see Figure 1). Despite all preparation

³ https://maximumeducation.com/news/survey_teachers%20

⁴ <https://wels.edulead.net/en/>

and the official launch of online education, the question of the National State Exam to be taken by 11th grade students remained unresolved. After being postponed several times, it ultimately took place in July. Notably, educational authorities agreed it had to be taken only by those graduates who wanted to enter university.

Figure 1. **Lockdown timeline in Russia**



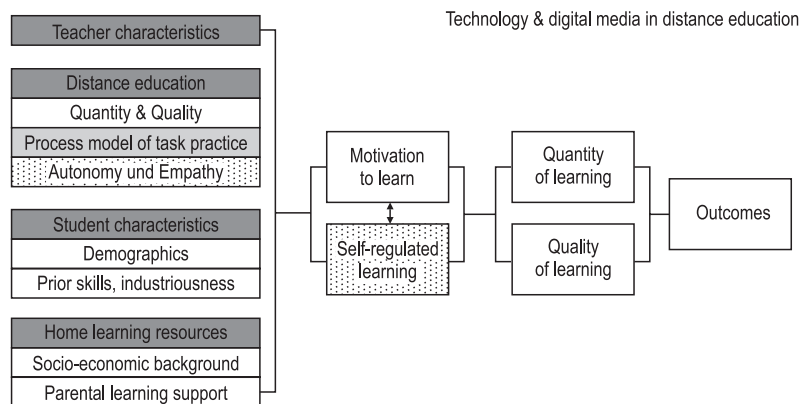
The Ministry of Education and regional authorities took some measures to support teachers and students during distance learning. Thus, the public platform “My school online” was launched by the Russian Ministry of Education in conjunction with leading publishers. The platform provided all necessary self-study materials with keys for students in Grades 1–11 to prepare for the final assessment. A hotline of the Russian Ministry of Education was operating continuously, providing methodological support for parents and teachers; more than

12,000 calls were answered. The Online Marathon of the Ministry of Education “Domashniy Chas” (“Home hour”) was launched in the social network “VKontakte”, offering the most relevant information regarding distance learning and life in self-isolation.

Theoretical Framework

The outbreak of Coronavirus and abrupt transition to distance learning was a new and unexpected challenge for the world, educational system, and every single person. In the new reality, where students’ learning was brought home and distance education became an integral part of our lives, it is impossible to identify what influenced students’ learning outcomes based on one theory only. In fact, theories of homework model practices developed before did not consider peculiarities of distance learning [Trautwein et al., 2006; Kohler, 2011]. Thus, WSLs integrated three theoretical frameworks (see Figure 2): homework practices (the white boxes) [Trautwein et al., 2006] extended to the process model of homework practice (the checked boxes), distance learning (the dotted boxes) [Wedemeyer, 1981; Keegan, 1986; Moore, 2013] and e-education (the light gray boxes) [Aparicio et al., 2016; Picciano, 2017]. This approach allowed to consider not only parents’ role in students’ education, student motivation, quality of homework practice and student homework behavior but also the quantity and quality of distance education, students’ autonomy, empathy, and the way distance learning was organized [Helm, Huber, Loisinger, 2021].

Figure 2. **Theoretical framework of technology & digital media in distance education.** Source: [Helm, Huber, Loisinger, 2021]



To analyze the factors that influence student learning outcomes during and after the Coronavirus Pandemic, the WSLs⁵ team deve-

⁵ <https://wels.edulead.net/en/>

developed so-called barometer-questionnaires, which measure different political, social and economic phenomena (e.g. Eurobarometer, or Afrobarometer). Barometer-questionnaires [Joye et al., 2016] collect current attitudes of respondents, they usually consist of a couple of questions (items) and are based on a cross-sectional approach.

Initially, the School Barometer Survey was developed to identify attitudes, and opinions of different stakeholder groups, such as parents, students, school management, and teachers. It consists of a number of questions (items) related to situations of self-isolation and transition to distant, or home, learning. It must be mentioned that all questions are optional. The survey was originally developed in German and then translated into Russian and other languages. The survey was validated by WSLs in previous research [Helm, Huber, 2023].

The School Barometer Survey allows us to analyze education-related problems that Russian families and schools faced during COVID-19 and identify the predictors of students' learning outcomes. The items from the School Barometer Survey used in this study are described in the following section.

Study variables

The theoretical framework of distance education was used as a basis for students' data analysis to identify the key predictors of students' home-learning outcomes. Each of the factors mentioned in the theoretical framework was presented by a number of questions in the School barometer Survey. The questionnaire measures several constructs with different numbers of items with response options ranging from 1 (strongly disagree) to 5 (strongly agree).

In this study, we used the survey to measure several constructs (Achievement, Learning Effort, and Student motivation) as outcome variables. Predictors were identified in the items of students' characteristics (age, self-regulatory skills, and attitude to digital learning); the time students spend on the activities that have positive and negative effect on learning (conducive activities and detrimental activities); resources (technical equipment, parental learning support, and family's ability to handle the crisis); distance education (quantity and quality). Table 1 presents a list of constructs measured and examples of items.

Table 1. **Study variables: outcomes and predictors**

Construct		Quantity of items	Examples of items
Outcomes	Achievement	1	I think I now learn more than by classroom teaching.
	Learning Effort	1	I currently spend X hours per week learning and doing tasks for school.
	Students' motivation	4	I find the whole "corona-situation" stressful.

Construct		Quantity of items	Examples of items
Predictors	Quality Distance Education	4	The teachers have a clue how to teach us digitally.
	Student Independence	4	For me, the most challenging part of the school closure is planning my own day.
	Engagement	1	I am looking forward to new ways of learning (e.g., e-learning).
	Conducive activities	4	I currently spend X hours per week reading.
	Detrimental activities	4	I currently spend X hours per week watching series and movies.
	Age	1	How old are you?
	Technical equipment	3	For me, the most challenging part of school closure is that I don't really have a computer/laptop/tablet to work and study with.
	Device 1	1	I have my own computer/laptop/tablet.
	Device 2	1	I borrow computers/laptops/tablets from my parents/siblings.
	Family 1	2	As a family, we deal well with the situation.
	Family 2	2	For me, the most challenging part of school closure is that my parents cannot help me.

Sample and procedure

The School Barometer survey was launched during the first wave of the coronavirus pandemic (20.04 — 12.05.2020) in Russia [Isaeva et al., 2020]. The sample is not purposeful, gets to a wider respondents' range within different groups (school authorities, principals, teachers, parents, students) and was formed on a voluntary basis

The respondents were found via social networks, emails, databases of associations, professional communities, conferences, associations of educational programs, alumni, and similar sources. As the non-probability snowball sampling method was used, it is complicated to track down how and through which source we contacted the students. Nevertheless, we assume that they were reached via schools or parents. In this way, the survey is not aimed at generalizing the findings about the groups under study on a national scale.

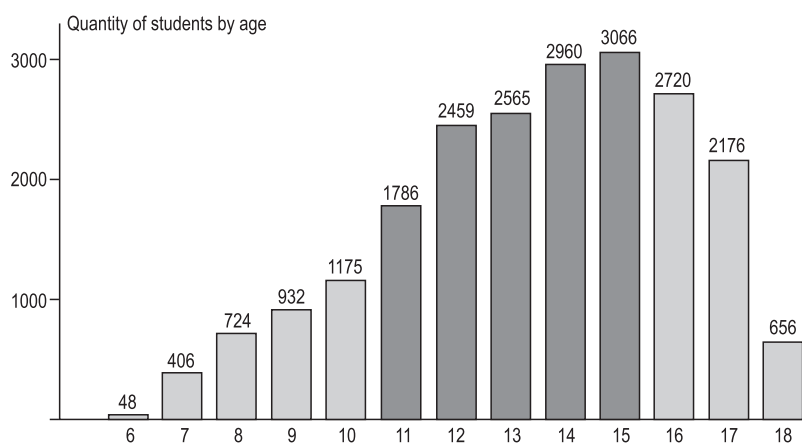
Overall, 71,409 people from all regions of the Russian Federation took part in the survey. Among the participants there were many students, which is not typical of ordinary mass surveys and indicates the relevance of the discussed topic to the respondents [Isaeva et al., 2020].

As a result, a total of 21,673 students from 85 regions of the Russian Federation took part in the survey. The information about the distribution of the population by regions of the Russian Federation was derived from the Federal State Statistics Service data to weigh

the sample. When comparing the share of the general and sample population, a serious discrepancy was identified for some regions. The weighing of the sample was carried out considering the share each region has in Russia.

As shown in the bar chart, secondary school students demonstrated greater participation in comparison to those of primary and high school: 59% of the sample are aged between 11 and 15 (see Figure 3).

Figure 3. **Number of student respondents by age**



What is more, participation increases at the ages of 14–15. We assume that such active participation in the survey can be explained by the age peculiarities. Dragunova [1976] claims that “it is important for teenagers that their maturity is noticed by others”. Teenagers perceive surveys as another form of self-exploration. Teenagers had this pressing need to be heard, and we suppose that the survey served as a platform for expressing their thoughts, worries, and feelings [Polivanova, 1996].

We can see that the percentages of students living in megapolises and in the country are almost the same, 19,6% and 19,8%, respectively, which corresponds to the distribution of rural and city schools, where half of the existing Russian schools are rural. However, we should also consider that 31% of students did not answer the question about where they lived, which can lead to misrepresentation.

The distribution of private and public schools reflects the current educational scene of Russia as there are less than 1% of private schools operating out of all the Russian schools (more than 45,377 schools in total) [Dukhanina et al., 2019; Kosaretsky, 2019].

Data analysis The WSLs research team used latent bivariate correlations and Relative weight analysis (RWA) to analyze the data and identify the key predictors of students' learning outcomes. The latent correlation matrix included all constructs mentioned in the section "Study variables". The latent variable model showed a good fit to the data according to the common model fit indices, with the Bentlers comparative fit index ($CFI \geq 0.90$), the Tucker-Lewis index ($TLI \geq 0.90$), the root mean square error of approximation ($RMSEA \leq 0.08$), and the standardized root mean square residual ($SRMR \leq 0.10$).

Next, the latent correlation matrix was used in RWA. RWA was chosen over regression as one of its advantages is being insensitive to multicollinearity. In fact, strong correlation between predictors is a problem for regression regression, but for RWA it is not. RWA aims to rank explanatory variables according to their level of significance. Significance here refers to the contribution to the coefficient of determination (R-square), which reflects what proportion of the variance of the dependent variable is explained by the predictors. In this way, RWA identifies those predictors that can explain the variance of the dependent variable the best. Assumingly, these are the predictors that more strongly affect the dependent variable [Helm, Huber, 2022].

This data analysis procedure was carried out for the whole sample.

All statistical analyses were conducted using the statistical software, R (R Core Team, 2014).

Results and discussion

In this paper, we consider that variables predict student learning outcomes if the percentage is more than 5. RWA analysis has not revealed statistically significant predictors for students' 'Achievement' (see Table 2). Moreover, only 12% of 'Achievement' are explained by the predictors identified (see Figure 4). RWA analysis found statistically significant predictors for the students' learning outcomes 'learning effort' (33% of learning effort is explained) and 'students' motivation' (71% of the sample is explained).

RWA analysis has shown that 71% of the Russian students' motivation are explained by the predictors where students' lack of self-regulatory skills is the strongest predictor with a 33% total size effect. Thus, whenever students responded, "for me, the most challenging part of school closure is planning my own day", they found themselves in a situation of stress. 'Students' motivation' was also explained by the lack of parental learning support (a 12% size effect), and stressful situations (a 7% size effect) were associated with the fact that the families could not cope with the pandemic. In fact, according to our data, 64,1% of parents think that students need considerable support in doing their homework. 57,8% parents consider that their child is left behind the school program because of the lockdown situation.

Table 2. Findings and discussion [Huber, Helm, 2020]

	Achievement	Learning Effort	Students' motivation
Achievement		0.01	0.01
Learning Effort	0.01		0.00
Students' motivation	0.01	0.01	
Age	0.01	0.03	0.03
Student lack of self-regulatory skills	0.02	0.02	0.34
Engagement	0.00	0.01	0.01
Conducive activities	0.01	0.13	0.00
Detrimental activities	0.03	0.02	0.02
Technical equipment	0.00	0.02	0.05
Own digital device	0.00	0.01	0.02
Borrow digital device	0.00	0.00	0.01
Family 1	0.00	0.01	0.07
Family 2	0.01	0.03	0.13
Quality DE	0.02	0.02	0.04

It must be mentioned that the School barometer has revealed already existing problems in the Russian educational systems, where instead of developing students' self-regulatory skills and responsibility, both teachers and parents use paternalistic methods, deciding everything for students. Therefore, whenever students were left in a situation which required to plan their day by themselves, they were feeling stressed. The importance of students' self-reliance in learning has been widely discussed by researchers (e.g. Vigotsky, Elkonin, and Davydov); nevertheless, the ideas of developing learning autonomy starting from primary school starting from primary school have been reflected in the Russian educational system recently. Developmental teaching designed by Elkonin and Davydov [Davydov, 2004; Elkonin, 1989] was the first educational program reflecting the core principles of students' autonomy development. Some Russian schools started implementing it in 1991, and in 1996, and it was recommended by the Russian educational standard. However, this educational program was carried out locally and did not spread all over Russia as it was still considered an experimental program, alternative to the traditional education. It is worth mentioning that in the 1960s, when this strategy was developed, Soviet education had different goals. The new educational standard of Russia (2006–2020) sees student autonomy as one of the goals of primary education; it states that schools should develop learning autonomy by creating an environment which con-

tributes not only to the independence of each learner, but also in the organization of the learning process itself [Zaitsev, 2019]. This means that teaching practices of schools had to see considerable changes since learning autonomy requires shifts in the role of a teacher. Now teachers should become observant assistants organizing the process of students' self-development [Ibid.]. Nevertheless, the professional role of a teacher required him/her to be the main active participant in the class, who constantly gives instructions to students, narrowing down students' role to fulfilling requirements over years. That is why it was challenging for students to plan and organize their learning during COVID.

In our survey, the students' answers to open-ended questions also reflect this situation:

"It's difficult to learn by myself, there is no one to ask a question (there is no teacher nearby), it's more complicated to grasp the material when you can't see the teacher face-to-face."

"Not all the subjects could be mastered completely without a teacher, and you can't sort it out by yourself."

"There is a lack of discipline, you are constantly distracted, you spend more time on the phone."

"At this moment, teachers don't help us with studies. Most topics have to be dealt with independently or with the help of tutors. Therefore, homework takes a lot of time."

Another finding of the RWA analysis is that low student motivation is also explained by the lack of technical equipment in families (a 5% size effect in 71% of the sample). About 84.6% of Russian students participating in PISA (2018) claimed to have personal computers at home, 85.2% did laptops, and did 74% tablets. According to Rosstat data, 22% of the people living below the average standard are children aged between 7 and 16 [Zair-Bek et al., 2020]. It is about a quarter of all Russian students. The School barometer revealed that 41.1% of Russian parents consider that they do not have enough technical equipment for remote learning. Teachers also mentioned issues with the equipment among the reasons for some students' being left behind the program during distance learning in the open-ended questions:

"...parents don't have enough laptops. Many work remotely, plus there are two or three students in the family, and everyone needs equipment."

"Many guys either do not have a computer or have one for several family members. Also, there's a lack of high-speed internet."

In fact, the number of large families in Russia reaches 1,566,000, where about 100,000 families have from 5 to 7 children and 929,000 families — 11 and more children. Therefore, even if a family had a personal computer or laptop, they faced the question of how to distribute time so that everyone could study online, considering that some parents had to work from home, too.

We suppose distance learning has contributed to educational inequality by limiting the accessibility of quality education as many children coming from poor families were facing major problems. Kosaretsky et al. [2022] claim that there is a correlation between students' subjective wellbeing and amount of home possessions. They revealed a significant decrease in the subjective wellbeing of those students whose home possessions were comparatively low, while those with the average or high level of possessions did not experience considerable shifts. 41% of families claimed a lack of technical equipment during the lockdown, which means that there were students who "dropped-out" from studies while the lockdown regime was on. What is more, one of the biggest concerns and impediments to the transition to remote learning was the issue of Internet accessibility across Russian regions. In fact, Internet accessibility in Russia has high interregional differentiation. According to a survey carried out by Rosstat, only 76.9% of households had access to the Internet in Russia in 2019. Furthermore, only 73.6% of them had broadband internet, which also hindered students' access to education. The data is different across the regions: from 50.6% broadband Internet owners in the Chukotka Autonomous Okrug to 93.9% in the Yamalo-Nenets Autonomous Okrug [Zair-Bek et al., 2020].

The situation with Covid and lockdown raised important questions in the educational community, such as "Whose responsibility is it to provide students with all the necessary equipment for education?" and "Do all children have their own study space?". The School barometer has revealed that parents expect schools to solve the issues with technical equipment, meanwhile school management team and educational authorities see it as parents' responsibility [Isaeva et al., 2020].

Another striking point revealed by the RWA, is that the time students spend learning and doing homework (Learning effort) is not explained by students' age. We assume that the Russian educational system is not homogeneous and learning loads depend rather on a particular school than a school grade (primary, secondary, or high school). Thus, for instance, a primary student at school A always studies more than a high school student at school B. According to Arshinskaya [2016], who analyzed secondary school students' perceptions of learning loads in three Russian cities, students at comprehensive schools, schools with in-depth study of particular subjects, lyceums, and gymnasiums perceive their loads differently.

Thus, while in a comprehensive school, only 38% of 8th grade students think that they cope with the learning load, in lyceums as many as 78% of 8-graders do. At the same time, Arshinskaya [2016] argues that students at comprehensive schools have a considerably smaller study load in comparison with those at lyceums and schools with in-depth study of particular subjects. The research illustrates that secondary students' pessimism about the study load increases over the years within comprehensive schools and it is the same in schools with in-depth study of particular subjects and lyceums [Arshinskaya, 2016]. In fact, study load increases starting from the 1st grade till the 11th due to the growing number of mandatory hours over the grades, but we assume that it is true within one school because of the heterogeneity of the Russian education system, which is caused not only by the school type, e.g. the comprehensive school or lyceum, [Karkashadze et al., 2017; Arshinskaya, 2016] but also by the settlement type, e.g. the city or village, and the region.

RWA analysis has identified that the strongest predictor of students' learning effort is reading (14% total size effect in 33% of the sample). We suppose that this is related to the fact that Russian teachers were not ready to teach online, whereas the traditional methods of teaching were not suitable for the new reality. Therefore, the majority of teachers found a solution in giving students homework according to the curriculum. In fact, one of the studies shows that teaching practices in Russia were limited to: giving homework (36% of the teacher respondents), 18% of teachers were testing one of the online platforms, organizing educational process by teachers themselves via Skype or Zoom (7%). 39% of the respondents practiced all the above⁶. The practices preferred can also be related to teachers' IT competence, which, in turn, tends to correlate with their age. According to the VCIOM's survey of 2018, 27% of 45–59 years old teachers do not use the Internet or rarely do, and the highest percentage of teacher “drop-out” is among 60 and older teachers [Zair-Bek et al., 2020].

Limitations The findings of this study should be considered in light of certain limitations.

Firstly, the complexity of the study and the wide research frame created a few barriers for the research. For instance, each of the five questionnaires consists of more than 45 questions covering seven different topics. In some cases, it led to single-item measures, when only one question was used to operationalize the construct. Problems with analyzing the results may arise for the constructs

⁶ https://maximumeducation.com/news/survey_teachers%20

with single-question measures, for example “Achievements” is measured by one question “I think I now learn more than by classroom teaching”.

Secondly, there is the problem of self-rating scale. The students were asked to estimate the time they were spending per week learning and doing tasks for school and to express their subjective opinion about whether they have begun to study more during the COVID-19 school lockdown. The above risks are partially offset by the fact that the School Barometer was conducted directly during the lockdown. Real time research compared to retrospective studies is less influenced by external factors, such as social desirability or biases.

Thirdly, the School Barometer is a self-reported instrument translated into several languages, so translation reliability becomes one of the most challenging points as there is insufficient evidence that respondents from different countries understood and interpreted the questions the same way. Due to the lack of time for survey approbation, such culturally specific constructs as, for example, “stress” [Hitchcock et al., 2005] could be comprehended differently by students in different countries. This should be taken into consideration when interpreting results.

Another methodological question is whether the outcomes are predicted only by the educational system alone. For example, do students’ motivation and stress levels depend on the new reality of distance learning or are they driven by external factors, including cramped living conditions, parents’ concern about job loss and the resulting stress, coronavirus anxiety itself, a lack of personal communication with peers, change in family relationships, changes in daily activities, falling family income, restriction of freedom of action and movement, and a lack of physical activity. According to research conducted by the National Medical Center for Children’s Health in Russia, the stress-forming situation caused by the pandemic affected the psychosomatic state of children: 83.8% of students had dysfunctional borderline mental reactions. Depressive manifestations and asthenic conditions can be assumed in 42.2% and 41.6% of children, respectively. Besides, the analysis of students’ arbitrary responses showed that in addition to issues related to distance learning, students faced psychological problems: they experienced anxiety and fear for no specific reason (11.9% of the respondents), considered the world boring (17.3%), and felt unsafe (6.1%) [Kuchma et al., 2020].

The primary limitation to the generalization of these results is the fact that the sample was formed on a voluntary basis. Thus, the survey results do not aim at generalizing about the groups (e.g. students or parents).

Conclusion The School barometer survey and RWA analysis brought to light the most pressing issues in Russian education, such as the lack of student autonomy, outdated teaching practices, and limited access to education. The importance of student autonomy is widely discussed by researchers all over the world. Nevertheless, contemporary teacher communities are traditional and show low flexibility when faced with any shifts; therefore, during distance learning, we could witness no significant changes in teaching practices and methods in Russia [Isaeva et al., 2020].

The COVID epidemic highlighted new directions for the design of school educational programs. Thus, hybrid learning can become one of possible solutions for educational flexibility, which implies not only a shift to online/distance learning but requires significant changes in teaching approaches, methods and practices. In its place, teachers will need a new type of professional support and curricula based on hybrid education and student autonomy. The question is what decisions will school leadership teams opt for: will they adhere to the well-trodden scenario before a new pandemic, or another black swan event happens? Or will they create new educational programs, which will be more flexible in the face of foreseeable change?

The issue should be studied in more detail through interviews with teachers and focus-groups with students to unpack particular situations and have a deeper understanding of survey responses.

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Appendix

Construct	All items	M	SD	α
Achievement	I think I now learn more than by classroom teaching.	3.10	1.39	—
Learning effort	I currently spend X hours per week learning and doing tasks for school.	13.62	8.51	—
Students' motivation	I find this whole "corona-situation" stressful.	3.19	0.62	0.67
	Personally, I feel very stressed/strained in the current situation.			
	I feel already really cooped in.			
	I am beginning to miss school.			
Age	How old are you?	13.53	2.95	—

Construct	All items	M	SD	α
Student lack of self-regulatory skills	I find it easy to get up early and have a regular daily routine.	2.85	0.69	0.61
	For me, the most challenging part of school closure is/are ... planning my own day.			
	For me, the most challenging part of school closure is/are ... the arrangements with the school / with my teachers.			
	For me, the most challenging part of school closure is/are ... learning at home.			
Attitude to digital learning	I am looking forward to new ways of learning (e.g., e-learning).	2.88	1.22	—
Conducive activities	I currently spend X hours per week reading.	5.11	4.03	0.62
	I currently spend X hours per week playing with my family.			
	I currently spend X hours per week Sports at home			
	I currently spend X hours per week helping at home.			
Detrimental activities	I currently spend X hours per week watching series and movies.	5.33	4.41	0.54
	I currently spend X hours per week Chatting online			
	I currently spend X hours per week Videocalling			
	I currently spend X hours per week PC and video games.			
Technical equipment	For me, the most challenging part of school closure is/are ... that I don't have a real computer/laptop/tablet to work and study with.	2.96	0.58	0.71
	I have enough opportunities to work on the computer/laptop/tablet for school.			
	Computers/Laptops/Tablets in our household are up to date.			
Device 1	I have my own computer/laptop/tablet.	3.70	1.39	—
Device 2	I borrow computers/laptops/tablets from my parents/siblings.	2.42	1.41	—
Family management of crisis	As a family, we deal well with the situation.	3.84	0.94	0.88
	My parents deal well with the situation.			
Lack of parental learning support	For me, the most challenging part of school closure is that my parents cannot help me.	2.23	0.91	0.44
	For me, the most challenging part of school closure is/are ... that I got so many other things to do, so I don't really get to study at all.			

Construct	All items	M	SD	α
Quality of distance education	My teachers are keen to learn with us digitally.	3.62	0.83	0.76
	The teachers have an idea of how they can learn digitally with us.			
	I have enough opportunities to work on the computer/laptop/tablet for school.			
	Coordination with my teachers works well.			

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